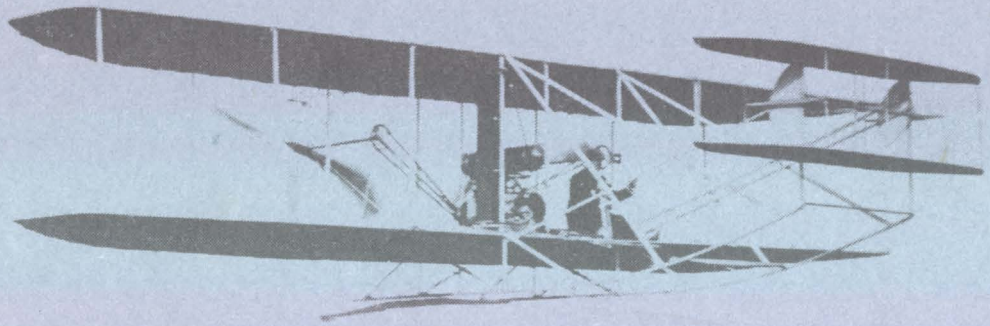
EARLY FLIGHT: 1900 - 1911



Introduction

Wilbur and Orville Wright conceived, designed, built, and flew the first airplane, thus fulfilling man's age-old desire to fly. They inaugurated the age of flight by adapting their invention into practical form, and instructing others how to fly.

A lesser-known fact is that the Wright brothers had a life-long interest in photography which paralleled their interest in flight. The photographs which they took document their experiments in early flight and provide an intimate view of their hard work and travels.

This exhibition guide contains a timeline of the Wright brothers' lives through their experiments with early flight. Also included are more extensive captions for photographs of particular interest. The number prior to the paragraph pertains to the number on the label of the photograph. Use this guide to conduct a self-tour of the exhibition "Early Flight."

Photo Captions

1. The first full-sized biplane glider had a wing span of 17 ft. and 165 sq. ft. of area. Many hours were spent flying the glider as an unmanned kite in October 1900. Only two minutes of piloted free gliding convinced the Wright's the control system would work but the glider must be larger.

2. After a short stay with a local family (Mr. & Mrs. William Tate), Wilbur & Orville set up camp about one-half mile from the village of Kitty Hawk. Orville cooked and Wilbur scoured the pans.

3. Members of the crew usually watched and often helped the brothers during their flight experiments.

4. Friend and advisor to the Wrights, Octave Chanute, traveled to Kitty Hawk in 1901 to witness the experiments. The Wrights were assisted by Edward C. Huffaker & George Spratt (not pictured) who were recommended by Chanute as capable aviation enthusiasts.

5. In 1901, the brothers returned to Kitty Hawk with their second glider. The number two glider spanned 22 ft. and had 290 sq. ft. of area. They established a new camp at Kill Devil Hills, 4 miles south of Kitty Hawk, and tested the glider in July and August.

8. All previous distance records for gliding were broken in the estimated 50-100 flights in August, 1901. The longest flight of the year was 389 ft. In spite of their success, the Wrights were discouraged by the limited lift and erratic control.

9. The flights of 1901 convinced the Wrights that previous data on lift was incorrect. From September, 1901 until August, 1902, they built a wind tunnel and tested air foil designs. This important research enabled them to make new, accurate tables of lift and to predict the performance of later machines.

10. Using the results of the wind tunnel experiments, Wilbur and Orville built a new, larger glider in August and September, 1902. The number three glider spanned 32 ft. and had 302 sq. ft. of wing area. The forward elevator was unchanged but a new, fixed double rudder was added for lateral control.

11. In October, a single movable rudder replaced the fixed double rudder. The movable rudder was connected to the wing warping control. This represented the final solution of three-axis control with their gliders. The design formed the basis for their first patent and confirmed the results of the wind tunnel tests. A new distance record was set, 622 ft., with a duration record of 26 seconds.

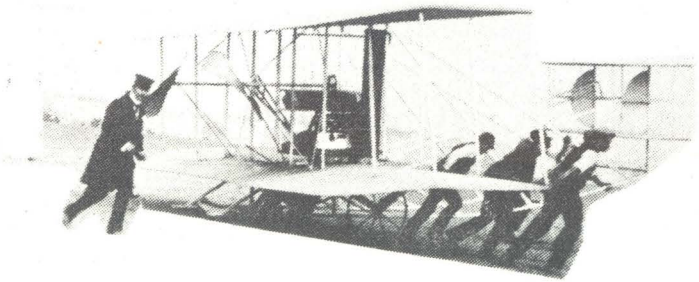
13. This unsuccessful glider, built by Lamson, was flown briefly at Kitty Hawk in 1902. Unlike the Wright machine which relied on pilot control, this glider was designed for automatic stability.

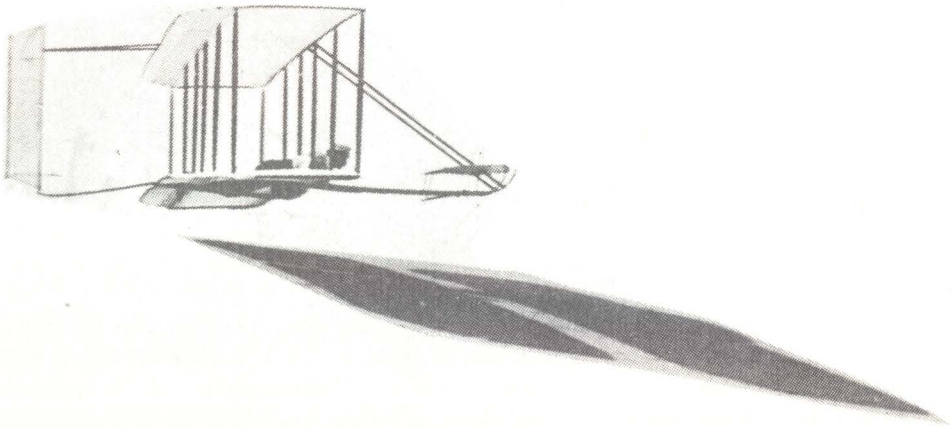
16. The 1902 glider frequently went out of control while turning. In October, Wilbur & Orville spent an evening discussing the cause. After drinking more than his share of coffee, Orville lay sleepless in his bunk. He finally focused on the fixed rear rudder as the source of the problem. In the morning he suggested the idea to Wilbur of a movable rudder, who saw that it could be combined with the wing warping control.

Captions continued after timeline

Timeline

1867	1871	1878	1881	1884
April 16, Wilbur Wright is born near New Castle, IN, the son of United Brethren minister Milton Wright & Catherine Koerner.	August 19, Orville is born at 7 Hawthorne St., Dayton, OH.	Wilbur & Orville's interest in flight is stimulated by the gift of a toy Penaudtype helicopter from their father.	Living in Richmond, IN, Orville begins to fly, build and sell kites.	The Wright family returns to Dayton.





1890	1892	1896	1896-98	1899
Orville & Wilbur form a partnership and begin publishing a daily newspaper The Evening Item; it folds after three months.	Brothers open a bicycle shop and begin sales, manufacture, and repair of bicycles. Continuing until early 1907, this business supports their aviation research.	A casual interest in flying is stimulated by the tragic death of German aeronautical pioneer, Otto Lilienthal.	The Wrights study bird flight and the experiments of Lilienthal and other pioneers. Their study convinces them that man would have to learn to glide before powered flight could be achieved.	They submit a request to the Smithsonian Institution for publications on aeronautical subjects including Samuel Langley's Experiments in Aerodynamics.

1899 cont.	1900	1901	1901-02	1902	1
In July and August, the Wrights build a 5 foot Biplane kite using wing warping for lateral control. The successful flights--witnessed by local schoolboys--encourages them to attempt their first full-sized, man-carrying glider.	Wilbur writes to an aviation pioneer in May, thereby initiating a friendship which lasts until 1910. In September and October, Wilbur and Orville travel to Kitty Hawk, NC, to conduct kite and piloted free glides.	Approx. 50-100 flights are made in August at Kitty Hawk with a larger glider. Flights range from 20-400 ft. Distance records are broken, but the machine performs unpredictably.	Extensive research is conducted testing air foil designs in a wind tunnel of their own design. The accurate lift tables from these experiments provide a major advance in aircraft/glider design.	In Sept.& Oct., the Wrights make hundreds of flights. After modifying the glider's rear rudder by making it movable, the glider demonstrates efficient three axis control.	F f

3	1904	1905	1906-07	1908	1909
st ghts.	The Wrights build a new machine and fly at Huffman Prairie, 8 miles from Dayton, OH. They develop a catapault launching device in September. The first complete circle is flown on Sept. 20; in Nov. they maintain flight for five minutes.	June-October, Wrights fly in Huffman Prairie. New machine has new propellers & control modifications. In 50 flights the aircraft turns, circles,& flies figure-8's. On Oct.5 Wilbur flies for 39 minutes and lands only when he runs out of gas.	The Wrights choose not to fly after 1905 until they have a contract for their aircraft. In early 1908, they sign an agreement with the U.S. War Department to furnish a flying machine & soon after sign a contract with a French company.	The brothers return to Kitty Hawk for practice before flight demonstrations begin. Wilbur travels to France where he flies from August thru Dec. Orville conducts a 3-week test at Ft. Myer, VA, before his tragic accident in Sept.	The Wrights fly before huge crowds in France, Italy, Germany, and America.

Captions Continued

18. Before the flight, Orville positioned the camera on a tripod between the camp buildings and the flying machine. The lens was focused just short of the end of the starting rail and John T. Daniels of the Kill Devil Hill Life Saving Station operated the shutter just as the flyer rose up in the air. The negative was developed by Orville when the brothers returned to Dayton.

20. These are photographs of the last flight made by the Wrights until May, 1908. It represented the culmination of their research at Simm's Station. Here they developed a practical machine that could take off, fly, maneuver, and land reliably under a variety of condition

22. After signing a contract with a French company in March, Wilbur arrived in France in May, 1908. Without practice he made his first public flights on August 8, 1908, at the Hunaudieres racecourse, 5 miles from Le Mans. The flights astounded his audience and brought the Wrights instant fame in Europe.

23. The Wrights signed a contract with the U.S. Signal Corps in February, 1908. Orville traveled to Ft. Myer, in early September to begin flight tests. In the first ten days he made ten flights, was airborne for over six hour and established altitude records of 200 and, later 310 f

24. 5:00 PM, September 17, 1908.

26. The launching derrick was developed for use with the starting rail to achieve the required velocity for take-off. The 5000 lbs. weight was hauled to the top of the derrick and then released. Though flights were occasionally started without catapault, the device never failed in thousands of starts and provided an extra margin of safety.

27. The launching track consisted of sections of two-by-fours laid on end with a thin metal strip on top. The machine was balanced on a small wooden truck with two modified bicycle hubs which rode on the track. Octave Chanute was much amused when he learned that the device cost $4.00 to build; the unsuccessful catapault built by Samuel Langley was said to have cost $50,000 to develop.

28. Wilbur relocated at Pont Long Field, Pau, France, in January, 1909, to begin training French pilots. Here in southern France, he made over sixty flights in February and March. Many of the flights were witnessed by European royalty who traveled there to see for themselves.

29. Orville, who was still recovering from his crash, joined Wilbur along with Katherine in Pau in January. They traveled together to Italy before Orville returned to the U.S. to resume his flights there.

31. In April, Wilbur flew at Centocelle Field, near Rome, Italy. Several flights were made without the use of the drop weight and five were made without the derrick or starting rail. Here the first motion pictures were taken from an airplane in flight.

36. Orville flew a modified machine for the speed trials at Ft. Myer. After successfully completing the tests, the Army purchased their first airplane.

37. Orville sailed to Germany in August to give exhibition flights for the Berlin newspaper, Lokal-Anzeiger. After a week of flights for small groups, he made the first public demonstrations on September 9. The crowd was estimated at 200,000 and included Crown Prince Friedrich Wilhelm and Crown Princess Cecilie.

48. An altitude record of 902 feet was established by Orville on September 30 for an audience including German Empress, Princess Victoria Luise and Prince August Wilhelm. Two days later, Crown Prince Friedrich Wilhelm became the first member of a royal family to take a ride in an airplane.

49. While his brother flew in Germany, Wilbur fulfilled a $15,000 contract for flights during the Hudson-Fulton Celebration in New York. The first flights over American waters took place, as Wilbur flew from the drill field at Governors Island around the Statue of Liberty on September 29. Several days later, he flew 20 miles, from Governors Island, up the Hudson River to Grant's Tomb, and back. The thirty-three minute flight was watched by more than a million people.

50. The Wright Company established a flight school in Alabama on the site where Maxwell Air Force Base now stands. In the spring of 1910, Orville trained five students to fly exhibition planes for the company.

52. Orville Wright and several pilots for the exhibition team of the Wright Company attended the International Aviation Tournament at Belmont Park, New York, in October. Orville flew the Wright Model R, "Baby Grand" and reached speeds between 70 and 80 miles per hour in the meet. On November 1, he took the director of the Wright Company, Cornelius Vanderbilt, for a ride.

53. Wright Company pilot, Walter Brookins, was scheduled to compete for the Gordon-Bennett International Trophy but crashed on take-off at the beginning of the race. The race was won by Englishman, Claude Graham-White at a speed of 61 miles per hour. On October 31, Ralph Johnstone, also a Wright flier, took a "Baby Grand" to an altitude of 9,714 ft.

54. Ground was broken for the Wright Company factory in January 1910. By May, a flight school began operation with Orville in charge of instruction. In the first year of operation, the factory produced about two airplanes each month.

56. Orville returned to Kitty Hawk in October, 1911, to conduct gliding experiments in the company of his brother Lorin, his nephew Horace, and British aviator Alexander Ogalvie. About 90 glides were made including several crashes in which Orville escaped injury. On October 24, in a 50 mile per hour wind, he established a soaring record of 9 minutes, 45 seconds, which stood for 10 years.

This guide was developed by the SITES Education Department to accompany EARLY FLIGHT: 1900-1911, an exhibition organized for a national tour, 1984-1986 by the Smithsonian Institution Traveling Exhibition Service (SITES), and Wright State University. Curated by Tucker Malishenko and Ron Geibert. Project Head, Pat Nolan. Exhibition Coordinator, Lori Dempsey. Exhibition guide coordinated by Joan Fram. Photographs courtesy of Wright State University. Exhibition funded by Hamilton Standard, a division of United Technologies Corporation.

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